4 GENERAL LABORATORY PRACTICES and PROCEDURES

4.1 Good Lab Practices

4.1.1 Policy

Intrinsic to the production of quality analytical data is the following of sound practices in all aspects of the organizational operations. Recognizing the necessity of maintaining control over general laboratory operations, the subsequent sections outline provisions for maintaining quality in all laboratory practices and procedures. .

4.1.2 Corrections

4.1.2.1 Corrections to records shall be made using a single line out with the date and the signature or initials of the analyst making the corrections. No changes shall be made with any technique that obliterates the original such as erasures or correction fluid. All records and corrections shall be in ink. Pencil shall not be used on analytical records.

4.1.2.2 Corrections to final production data must be done by reprinting final data sheets with the corrected results and shall be transmitted with a cover memo denoting that the report is to correct data previously reported. The file must contain clear documentation as to why the corrections were necessary.

4.1.3 Following SOPs/LOQA Manual

It is the policy of the ASB that SOPs and the ASB LOQA Manual be followed by all ASB staff and by ESAT support contractors. Significant deviations shall be coordinated with the appropriate supervisor and/or ASB QAO and the rationale for the deviation shall be clearly documented and included in the project file.

4.1.4 Manual Peak Integration

Electronic data reduction is used for several of the more complex analysis systems. Analysts are required to review the electronic data processing for accuracy and consistency with appropriate data reduction techniques. Some electronic reduction can result in incorrect actions by the system and for these instances manual override and correction of the electronic processing is appropriate. Examples of this may be such items as integration of an incorrect peak, errors in calculations, or

misplacement of baseline in peak integration. When manual override of the electronic process is deemed appropriate, analysts shall document the action taken and why. The action should be concurred by the Secondary Review Analyst. **Manual override actions are appropriateonly to correct inaccuracies and shall be done in accordance with sound analytical procedures.**

4.1.5 Check Lists - Primary Analyst/Secondary Analyst Review

Analytical data reduction activities for both the primary analysis and the secondary review shall be documented using the appropriate data review check list. Check lists are designed for the procedure(s) being performed. The individual data review check lists for organic and inorganic analyses are maintained on the Region 4 SESD's local network drive (K: drive) in appropriate subdirectories of K:\ASB\Forms\OCS\ and K:\ASB\Forms\ ICS\.

4.1.6 Training Requirements

ASB has developed a set of basic training modules for each employee. Each new staff member shall take the training during their first year and periodic refresher sessions shall be required for all staff. Documentation of training is maintained on a staff training sign up sheet (see file located on the K: drive at K:\ASB\ forms\branch) The sign up sheet is maintained by the ASB Secretary. The following training modules are required:

Title of Training	When Required	Person(s) Responsible
Familiarization and Review of the ASB LOQA Manual	During first 6 months of employment and anytime changes are made	ASB Management
Data Integrity	During first 6 months of employment and every 2 years thereafter	ASB Management
Laboratory Safety	Initial 24 hr. training during first quarter of employment and 4 hr refresher annually thereafter.	ASB Safety Officer
Management and Purchasing of Chemical Inventories	During first 6 months of employment and every 2 years thereafter	Chemical Hygiene Officer

Title of Training	When Required	Person(s) Responsible
Handling, Disposal and Minimization of Waste	During first quarter of employment and every 2 years thereafter	ASB Management/Waste Disposal Officer
Proper Usage and Storage of Materials in the HAZMAT Facility	During first quarter of employment and every 2 years thereafter	ASB Management/Waste Disposal Officer

4.2 Document Control/File Management

4.2.1 Chain of Custody Log Books

ASB analysts check samples in/out of the Custody Room using Custody Log books (reference Chapter 3). When completed these log books shall be transferred to central records for the Division. Ultimate retention and disposal will be according to Agency record management rules and regulations.

4.2.2 Chain of Custody - Receipt Form

The sample custodian/designee receives a chain of custody record with every shipment of samples. The chain of custody is initiated by field sampling personnel and includes every sample received within the shipment, indicates analyses requested, and serves as the custodial transfer of the samples by signature to the ASBSCC/designee. The forms/formats used are generated and maintained by the sampling organizations. This record shall be maintained by the Sample Custodian until such time as the samples are cleared for disposal and then shall be transferred by the custodian/designee to the Branch Secretary for coordination with central records for inclusion in the appropriate project file.

4.2.3 Instrument/Analysis Log Books

Each analysis area maintains records using log books. These log books are maintained within the local laboratory area when in use. When full, these log books shall be maintained by the section chief, lead analyst or designee in a local file for a period of 1 year and then transferred to central records for the Division. Ultimate retention and disposal will be according to Agency rules and regulations.

4.2.4 Instrument Maintenance Log Books

Each major instrument shall have a maintenance log book. Major service and repair records are maintained in these log books. Active log books are maintained within the laboratory for which the instrument has major use and should be maintained with the instrument throughout its useful life. At such time the instrument is removed from service the log book may be discarded.

4.2.5 ASB Laboratory Operations and Quality Assurance Manual

The most current version of the ASB LOQA manual is maintained electronically by the Branch QAO. The manual is available to all EPA and ESAT staff as "read only" on the K: drive at K:\ASB\QA Manual - Current Version. While hard copies of the manual may be printed, it is the responsibility of each individual to ensure that they are using the most current version. The ASB LOQA Manual shall be maintained as described below:

4.2.5.1 The manual will be reviewed in total once each year on a February to February cycle. If circumstances prevent the February review, the manual shall be reviewed as soon as possible thereafter.

4.2.5.2 The annual review and versions in use for any given period of time will be tracked by date. No matter when the review is completed the next review should be targeted for February of the following year. When the annual review is completed, the LOQAM Annual Review Form (current form maintained on the K: drive at K:\ASB\ forms\branch) shall be signed as designated below and the review completion date on the electronic version of the LOQAM shall be changed by the ASB QAO. {Revision numbers are not used} The annual review form signature page shall have the names of the signatories typed onto the electronic copy. The hard copy with signatures will be maintained by the ASB QAO. Signatories will be the Inorganic and Organic Section Chiefs, the Branch Quality Assurance Officer, and the Branch Chief. The effective date of the review will be the signature date of the Branch Chief.

4.2.5.3 In an effort to keep the manual as up to date as possible, changes may be made at any time deemed appropriate during the calendar year. When this occurs, a change authorization page will be placed at the front of each chapter for each change that is made and documented using the LOQAM Change Authorization Form maintained on the K: drive at K:\ASB\ forms\branch. The change authorization will include a brief description of the change(s) and reference the affected sections of the chapter. The original hard copy of the change authorization form, with

signatures, will be maintained by the ASB QAO. Signatories for the change authorization will be Organic and Inorganic Section Chiefs, Branch QAO, and the Branch Chief. The effective date of the change will be the signature date of the Branch Chief.

4.2.5.4 When the annual review of the entire manual is completed, the update will be noted as specified above and any change authorization pages completed during the year may be removed. Historical changes made will be maintained electronically by the ASB QAO. The ASB QAO will also maintain a file of the hard copy Change Authorizations that are removed at the time of the full manual review/update cycle. This will facilitate future reference to historical manuals and their changes that were in effect during any given period of time.

4.2.5.5 Change Procedure for the ASB LOQA Manual

Any ASB staff person may suggest changes either during the annual review cycle or at any time during the calendar year. The following procedure should be used:

4.2.5.5.1 The individual making the suggested change should download from the LAN the most current WordPerfect version of the chapter within which the change is to be proposed {note: the copy on the LAN is protected as 'read only', however, the downloaded version may be written to make suggested changes};

4.2.5.5.2 The proposed change should be made using "strike out" for deletions and "redline" for additions;

4.2.5.5.3 The proposed change should then be forwarded by email to the immediate supervisor with the entire chapter(s) containing the proposed change(s) as a WordPerfect attachment. For easy reference, the specific section(s) containing the changes(s) should be listed in the email and a brief explanation about the rationale for the change;

4.2.5.5.4 If necessary, the supervisor will discuss the change with the recommending individual and others as appropriate. If the supervisor concurs, the entire chapter with the change(s) will be forwarded electronically to the ASB QAO. The hard copy of the Change Authorization will be forwarded to the ASB QAO with the

Section Chief Signature. The QAO will evaluate the change(s) and clarify any issues as necessary. If the QAO concurs, he/she will sign the hard copy of the Change Authorization form and will forward to the Chief, ASB for final approval/signature. When all approvals are complete, the ASB QAO will make the changes to the official manual on the LAN. The final concurrence signature of the Branch Chief will constitute the effective date.

4.2.5.5.5 In the event that the QAO is not available, the change would normally be delayed until the QAO has had an opportunity to review and initiate the change. If, however, the change is deemed necessary for immediate application, the Branch Chief will authorize the change and assign the change to the Branch Secretary. The Branch Secretary will make the change and present all the documentation to the QAO upon his/her return.

4.2.5.5.6 Once the change is completed the QAO (or alternate) will send an email to all ASB staff and the Project Officer (PO) for the ESAT contract as official notification of the change. It is the responsibility of the ESAT PO to ensure that all appropriate ESAT staff are notified.

4.2.5.5.7 It is the responsibility of all staff to review the change and to become familiar with how it may affect their individual operation.

4.2.6 Standard Operating Procedures/Methods

SOPs shall be written based on agency guidance EPAQA/G-6 “Guidance for the Preparation of Standard Operating Procedures for Quality Related Documents”. The format for preparing SOPs shall be as shown on the form for SOP Preparation that is maintained on the K: drive at K:\ASB\ forms\branch. The effective date of the SOP shall be the date the last signature (Branch Chief) is placed on the cover sheet for SOP Preparation located on the K: drive at K:\ASB\ forms\branch. Reviews and editorial changes for clarification to SOPs are tracked continuously on the SOP Review - Tracking Form located on the K: drive at K:\ASB\ forms\branch. Modifications to SOPs require a rewrite of the SOP and are also documented on the SOP Review - Tracking Form. When new SOPs are placed into service the Review - Tracking Form is initiated and shall remain with the SOP during it’s lifetime of use to track reviews and any modifications that may be made to the procedures. Where appropriate, any alternate test procedure approvals for

specific SOPs will be maintained by the Section Chief along with the original copy of the SOP. SOP's for methods that are no longer used, along with their Review - Tracking Form, shall be maintained in hard copy for a period of 3 years by the specific Section for which the SOP was used and then transferred to central records for the Division. Ultimate retention and disposal will be according to Agency record management rules and regulations. The ASB QAO will retain an electronic copy of the SOPs.

4.2.6.1 Each time a new method is implemented into the operational procedures of the laboratory the Chief of the Section responsible for the new method shall ensure that all initial demonstrations of capability are properly performed, that the Branch QAO has reviewed the technical data for the method implementation and finally that the SOP is properly written and placed into the inventory of active SOPs. Included with the SOP should be the SOP Review - Tracking Form (current version located on the K: drive at K:\ASB\ forms\branch) The Branch QAO must be notified and provided an electronic copy of the new SOP containing the typed names of all signatories. Signatories will be the author of the SOP (which is usually the analyst responsible for the SOP), the Section Chief responsible for the SOP, the Branch QAO, and the Branch Chief. The final concurrence signature of the Branch Chief will constitute the effective date.

4.2.6.2 Section Chiefs are responsible for insuring that SOPs are reviewed in detail, at a minimum, once every 3 years or sooner if substantive changes are made to procedures. Each detailed review shall be documented by the Section Chief or designee on the original SOP Review - Tracking Form and the ASB QAO notified via email when the review has been completed. If there are any changes, the SOP should also be transmitted to the ASB QAO as an electronic copy. The updated electronic SOP reflecting these changes will have the same documentation that is found handwritten on the Review-Tracking Form hard copy. If there are no changes, the SOP need not be transmitted to the ASB QAO as an electronic copy. The original hard copy of active SOPs will be maintained by the Section Chief within the Section for which they are used. The ASB QAO will maintain electronic copies of the SOPs on the LAN. It is the responsibility of each Section Chief to ensure that the ASB QAO has the latest version of the SOP for placement onto the LAN. SOPs shall be tracked as follows:

4.2.6.2.1 SOPs are titled by EPA method number to include the revision number and date of the revision. {e.g., 3500 Revision 0, April 1995.} If the method includes an ASB modification [a

modification being defined as a substantive change in the method scope or the chemistry of the method] the SOP shall be titled with the added suffix... "Mod X, date of mod"{e.g., SOP Title: 3500 Revision 0, April 1995, Mod 1.0, May 2000}

4.2.6.2.2 For methods that do not have an EPA number, SOPs are titled with the method number and/or title as appropriate to best describe the origin of the method. {e.g., State of FL Method 101, revision 0, May 1992, ASB Mod 1.1, June 1998}.

4.2.6.2.3 For methods developed within ASB, SOPs shall be titled with an ASB method number that will be assigned by the ASB QAO. The title will include an alpha character to denote the type analysis or general procedures as follows:

V = volatile; P = pesticides/PCBs; E = extractables (semivolatiles); M = metals; C = classical/nutrient analyses; G = general procedures; if further modified at a later date a fractioned decimal will be used to title the modified method. In all cases the date of the method or mod should be included.{e.g., ASB100V, Sep 95....if modified later would become ASB100V.1, Mar 98, etc.} ASB method numbers are assigned, tracked and controlled by the ASB QAO.

4.2.6.2.4 Changes to SOPs are categorized as modifications or editorial. All changes shall be briefly described in the SOP Review-Tracking Form and initialed by the Section Chief for approval.

4.2.6.2.4.1 Modifications are changes in the chemistry, revision number of the original method, or the scope of the method. Modifications shall be described in the comments section of the SOP Review-Tracking Form and require a new signature page with signatures of the Responsible Person, the Organic or Inorganic Section Chief (as appropriate), the Branch Quality Assurance Officer, and the Branch Chief. The date recorded on the SOP Review-Tracking form for the change should match the date that the signature page is signed by the Responsible Person. The effective date of the SOP is the date that the document is signed by the Branch Chief. The updated hard copy consists of the updated signature page, the updated Review-

Tracking Form, copies of previous signature pages, and the updated SOP.

4.2.6.2.4.2 Editorial changes include all changes other than modifications and shall be described in the comments section of the SOP Review-Tracking Form. Editorial changes require review by the Section Chief, but a new cover page is not required. The updated hard copy consists of the current signature pages, the updated Review-Tracking Form, and the updated SOP.

4.2.6.2.4.3 At times, it is appropriate to update the signature page without changing the SOP (e.g., to reflect corrections to that page or to change the responsible person). These changes are editorial in nature and shall be described on the SOP Review-Tracking Form. The date recorded on the SOP Review-Tracking form for the change should match the date that the signature page is signed by the Responsible Person. The effective date on the updated signature page is that of the original SOP. The Responsible Person and the Section Chief are the only signatures required on the updated signature page. A copy of the original signature page is included with the updated SOP. The updated hard copy consists of the updated signature page, the updated Review-Tracking Form, copies of previous signature pages, and the current SOP.

4.2.6.2.5 An SOP inventory and tacking form for ICS and OCS that includes all current ASB SOPs is maintained on the K:drive at K:\ASB\Forms\Branch. This table lists the last review date and the due date for the next thorough review of the SOPs. This table should be reviewed and updated at least annually when the LOQAM is reviewed. SOPs due for review during the upcoming year should be noted by the respective section chiefs and put on their schedule for review by the due date.

4.2.7 Project Files

Each analytical project has a “project file”. Where possible, all information placed in the project file will be originals. In some instances, such as bound log books, it may be necessary to make copies; however, it is essential that the copy placed in

the file be the exact copy of the original.**If corrections are deemed necessary to the original after the project file has been completed, the primary analyst or lead analyst will ensure that a copy of the corrected page(s) are placed in the file and the old page(s) removed.** If the final data reports, either in part or in total, must be corrected or clarified and reported again, a new memo shall be generated for transmittal of the correction, explaining the nature of the correction and placed into the project files along with the corrected data. The project file will contain, at a minimum, the following hard copy information:

> Chain of custody record(s); Final Production Data Reports complete with transmittal memos; All raw data used in the decision making process of obtaining reported results including, but not limited to: QA/QC information, secondary review check lists, chromatograms, raw quantitation reports, calculations, any special notes concerning the project, copies of log book pages, etc.; correspondence (memos or electronic mails or other documents relevant to the project); Sample disposal records.

The analytical information is maintained by Branch analysts while the project is in progress. When completed the raw data is transferred by the Lead Analyst or designee to central records for inclusion into the project file. Other records are transferred to the Branch Secretary for coordination with central records for proper inclusion into the project file. Ultimate retention and disposal will be according to Agency record management rules and regulations. The official record will always be the hard copy project file, which should include hard copies of electronic records. It is absolutely essential that the hard copies placed into project files exactly reflect the electronic data. Notably, e-data is often maintained as well in its original electronic format. In these instances it shall be the policy of ASB that : (1) e-data is maintained in a logical and documented sequence such that retrieval, if necessary, is readily accomplished; (2) e-data records must be securely filed such that there can be no unauthorized amendment of the data and that the integrity of the stored data is maintained (3) e-data that is archived may be discarded when the disposal of the associated project file is so authorized.

4.2.8 General Correspondence

All general written correspondence (memos, letters) from ASB technical staff to any party external to the Branch but internal to the Division shall be reviewed and approved by the respective supervisor and shall have the supervisor as a “THRU” signatory. All correspondence external to the Division shall also include the Branch Chief as a “THRU” signatory. All correspondence should be submitted to the Branch Secretary to put on proper letterhead and format. Coorespondence

that is related to specific projects shall be filed in project file. General coorespondence (other than thank you memos/letters) shall be filed according to the ASB Divisional File Plan for general correspondence.

4.2.9 Training Files

There shall be a training file maintained for each ASB staff member by the Branch Secretary. The file shall contain all training documentation to include conference and seminar participation.

4.2.10 QA/QC Records

For practical operations certain records of QA/QC are better retained and maintained by the Analytical Sections and others by the Branch QAO.

4.2.10.1 The following raw QA/QC data shall be maintained by the **Section Chief or designee:** All analysis specific quality control raw data such as:

4.2.10.1.1 DOCs ; IDLs; MDLs, etc ;
4.2.10.1.2 Raw data records of all spikes, replicates, and surrogates and updates of acceptancelimits for each (copies of acceptance limits and updates of acceptance limits shall be sent to the Branch QAO);
4.2.10.1.3 all raw data related to validation of new methods/techniques.

4.2.10.2 The following QA/QC documents shall be maintained by the **Branch QAO:**

4.2.10.2.1 General quality assurance records such as performance testing, copies of acceptancelimits and updates of acceptance limits;
4.2.10.2.2 Certification of thermometers and weights;
4.2.10.2.3 Internal and external audit records and responses,
4.2.10.2.4 Copies of method validation studies, and
4.2.10.2.5 Special issue investigations.
4.2.10.2.6 Summaries of Quality Control Data
4.2.10.2.7 Summaries of DOCs; IDLs; MDLs
4.2.10.2.8 Summaries of Acceptance Limits for QC parameters

4.2.11 Document/Forms Revisions

Many forms and documents (e.g., SOPs, log books, data review check lists, extraction/preparation logs, etc.) are generated within ASB. All forms will be maintained by the ASB QAO in the appropriate subdirectory on the K: drive at K:\ASB\ forms\. These forms shall be reviewed periodically and changed as necessary. Changes to these forms are authorized by the Branch Chief or Section Chiefs by sending an email to the Branch QAO denoting the approval and with a copy of the changes. The QAO shall then post the changed copy to the K:drive and notify all appropriate staff of the change completion. Forms will be assigned a version number by the QAO and the most current version will always be as listed in the appropriate subdirectory on the K: drive at K:\ASB\forms\.It is the responsibility of each staff member to ensure that they are using the latest version by using the current version as listed on the K: drive. If there is ever any question confirmation with the ASB QAO is required.

4.3 Laboratory Apparatus and Instruments

4.3.1 Incubators and Waterbaths

4.3.1.1 If an automatic temperature recorder is not used for incubators, place a certified thermometer (preferably within a bottle of water) on a central shelf and record temperature at least once each working day (more frequently if required by methods/SOPs) when the incubator is in use. "In use" shall be defined as when the unit contains materials for which a specified temperature is required by method, policy, or procedure. If for any reason a unit is not being used for this purpose, it should be so noted in the temperature record log and daily checks will not be necessary while not in use. In order to place a unit back into use, a current temperature measurement must be taken for verification that it is at the proper temperature for use. This must be documented in the temperature recording log indicating that the unit has been placed back into active service and then daily checks must resume. For water baths monitor and record temperature in the analysis log at least once each working day while in use or as may be specified by the method.

4.3.1.2 Be sure to check temperature variations when incubators or waterbaths are loaded to capacity and document this check in the analysis log or temperature log, which ever is appropriate.

4.3.1.3 Drain and clean waterbaths periodically as recommended by manufacturer, by methods or by accepted practice.

4.3.2 Refrigerators /Freezers/Drying Ovens

4.3.2.1 Check and document the temperature each working day that the refrigerator, freezer or drying oven is "in use". "In use" shall be defined as when the unit contains materials for which a specified temperature is required by method, policy, or procedure. If for any reason a unit is not being used for this purpose, it should be so noted in the temperature record log and daily checks will not be necessary while not in use. In order to place a unit back into use, a current temperature measurement must be taken for verification that it is at the proper temperature for use. This must be documented in the temperature recording log indicating that the unit has been placed back into active service and daily checks must resume.

4.3.2.2 Periodic check of contents is required and outdated materials should be properly disposed per environmental management requirements.

4.3.2.3 Do not store food in any laboratory refrigerator or freezer. There is a refrigerator in the lunchroom for storage of food. Drying ovens should never be used to warm food or for drying eating utensils.

4.3.3 Autoclaves

4.3.3.1 Check and document the temperature each time the unit is in use and/or as required in the analytical methods.

4.3.3.2 At a minimum record the date, and sterilization time, and temperature for each cycle.

4.3.4 Balances

4.3.4.1 Accuracy of balances should be validated with NIST traceable weights at the time of use and the verification should be documented in the appropriate analysis log. Weights are verified annually and should meet the NIST referenced ASTM Class 1 or Class 2 requirements or equivalent. This is required on an annual basis and re-certification is coordinated by the Branch QAO

4.3.4.2 Clean and level balances as required.

4.3.4.3 Maintain annual maintenance services contract and records of the maintenance performed.

4.3.5 Thermometers

Unless otherwise specified by regulatory methodology, it is the policy of ASB to use only non-mercury containing thermometers in all laboratory operations. All thermometers used within ASB will be NIST traceable. This is required on an annual basis and re-certification is coordinated by the Branch QAO.

4.3.6 Mechanical Dispensing Devices

Mechanical volumetric dispensing devices (except Class A glassware) shall be checked for accuracy on at least a quarterly basis. Glass microliter syringes are exempt from this requirement; however, such syringes used for volumetric dispensation must have been demonstrated for accuracy as documented by the manufacturer.

4.3.7 Records of NIST Traceability

Records of NIST traceability for thermometers, weights, and analytical syringes shall be maintained by the **Branch QAO**. All staff are responsible for insuring that they coordinate with the Branch QAO each time new supplies for these items are ordered and/or any time a re-certification of any of these items occurs. Staff will ensure that the Branch QAO is furnished originals of any documentation received with new purchases or recertification.

4.3.8 Major Instrumentation

4.3.8.1 Major Instrumentation includes such items as: Inductively Coupled Plasma; ICP/Mass Spectrometer (ICP/MS); Gas Chromatographs (GCs); GC/MS; Graphite Furnace Atomic Absorption; autoanalyzers; Accelerated Solvent Extractors; Gel Permeation Chromatography (GPC);

4.3.8.2 All major instrumentation shall be maintained in accordance with manufacturers recommendations and operational guidance. Maintenance records shall be maintained on each instrument. Additional details on maintenance, calibration and trouble shooting procedures are contained in Chapter 8 for Organic Analyses and Chapter 9 for Inorganic Analyses.

4.4 Laboratory Supplies

4.4.1 Glassware

4.4.1.1 Glassware used in general laboratory operations must be of a high quality borosilicate glass, e.g., "Pyrex" or "Kimax." Volumetric glassware must be of a Class "A" quality.

4.4.1.2 Clean glassware in accordance to individual SOPs. For more detailed instructions for glassware preparation see Chapter 8 for Organic Analyses and Chapter 9 for Inorganic Analyses.

4.4.1.3 If, at any time a new washing compound or cleaning application is introduced, tests shall be performed to assure that the glassware is free of interferences before routine analyses are begun.

4.4.2 Chemicals, Reagents, Solvents, Standards, Gases

4.4.2.1 The quality of chemicals, reagents, solvents, standard gases, used in the laboratory is determined by the sensitivity and specificity of the analytical techniques being used. Reagents of lesser purity than specified by a method will not be used.

4.4.2.2 Reagents, chemicals, solvents, and standard reference materials (excluding high-demand items) should be purchased in small quantities to minimize extended shelf storage.

4.4.2.3 Date all reagents, chemicals, solvents, and standard reference materials when received and when opened or prepared, and discard when outdated, or when evidence of deterioration is detected.

4.4.2.4 Storage of large quantities of some chemicals is required in the Hazardous Materials (HAZMAT) Facility. This includes such items as concentrated acids and organic solvents. Access to the HAZMAT facility is restricted to the following procedure:

> **4.4.2.4.1** If any individual within ASB has a need to place items into the HAZMAT they must contact an individual authorized to coordinate the placement. This is restricted to staff members **Mike Wasko and Samuel Dutton** as primary contacts and, if they are not available ASB supervisors should be contacted. In ALL INSTANCES the placement of items INTO the facility will be coordinated with the SESD Waste Control Officer.

4.4.2.4.2 Any chemicals that need to be retrieved from the HAZMAT facility may be done by any ASB analyst. However, personnel retrieving chemicals from the facility must ensure that only the items needed are removed and nothing else disturbed.

4.4.3 Procurement of Chemicals and Chemical Inventories

4.4.3.1 Chemical inventories within the Science and Ecosystem Technology Center (SETC) and within ASB must be controlled and monitored. These controls are particularly critical for P-Listed hazardous chemicals which must be tracked from the point of purchase to final disposal. The documentation of the chemical inventories is the responsibility of the SESD Chemical Hygiene Officer (CHO) who is on the staff of the ASB.

4.4.3.2 Only persons who have been trained in the proper handling of P-Listed chemicals will be authorized to use them. The training will be conducted by the Chemical Hygiene Officer (CHO) and/or the Safety, Health and Environmental Management (SHEM) Officer of the Science and Ecosystem Support Division (SESD) or a designee. Each individual taking the training will be required to sign documentation confirming that they have completed the training and that they understand the proper procedures for ordering, use, storage, and disposal. The Chemical Hygiene Officer (CHO) for SESD will coordinate with the Branch Secretary on the maintenance of the files for training on P-List chemicals handling.

4.4.3.3 All P-Listed chemicals will be tracked using the "Chemical Tracking Form" that is maintained on the K:drive at K:\ASB\forms\branch\ and following the procedure as outlined below. The Chemical Hygiene Officer will maintain the files of the Tracking Forms.

4.4.3.3.1 Ordering of Chemicals

Chemical purchase orders should be prepared separate from other supplies. After required approvals from management, procurement requests for ALL chemicals (both P-Listed and non-P-listed) will be routed to the CHO. The CHO will place orders for chemicals to be received at the Science and Ecosystem Technology Center (SETC). Chemicals for delivery to the Field Equipment Center may be ordered by EIB designated individuals, but all orders must be sent through the CHO for signature and tracking.

If the CHO is unavailable and there is an immediate need to place the order: 1) Get required approval from management for the purchase; 2) Refer the order to the Management Analyst in the Immediate Office of the Division Director; 3) The SESD Management Analyst will place the order and subsequently transmit all information about the order to the CHO.

The CHO will screen the orders and will initiate the tracking system for P-Listed chemicals as appropriate. The CHO will also maintain a suspense file for all chemical orders to ensure against inappropriate redundancy, to monitor for delivery/receipt of all chemicals into the Laboratory, and to maintain chemical inventories of all chemicals. Questions and/or issues that may arise will be coordinated by the CHO with the appropriate analyst and/or manager.

Laboratory analysts are responsible for insuring that ALL CHEMICALS are maintained within the area designated for use and storage by the chemical inventory system and tracking forms. The CHO must be notified and all tracking documentation updated if the materials need to be moved and/or stored in a different location. The Chemical Inventory shows a maximum amount of each specific chemical that may be in the individual laboratories at a given time. It is acceptable to have less than the inventory shows, but never more. Coordinate ordering of replacement chemicals so that the maximum is not exceeded. If a new chemical needs to be added to the inventory or if inventories must be increased, coordinate with the CHO.

4.4.3.3.2 Receipt of Chemicals

The CHO will be listed on the purchase as the person to receive all laboratory chemicals delivered to the SETC. If the CHO is not available a designee may be appointed to log in chemicals required for immediate needs.

When chemicals are received the supply room clerk will immediately notify the CHO (or designee if appropriate).

The shipment will remain within the supply room area for pick-up.

The CHO will check the order and initiate all appropriate documentation.

The CHO will notify the requestor/analyst of the receipt and will coordinate transfer of the order to the analyst.

Analysts will record his/her initials and the date on the individual containers of chemicals when first opened for use.

Upon receipt of an order of P-Listed chemicals the CHO will:

Log the material into the chemical inventory;

Initiate the P-List tracking system documentation;

Place the date of receipt on the bottle;

Label the container (s) with a red "P";

Notify the requestor/analyst that the order has been received;

The shipment will remain within the supply room area for pick-up by the CHO or by the appropriate analyst;

P-Listed chemicals are transferred to the requestor/analyst after signing the tracking form and should be stored for use only within the designated area as recorded on the tracking form.

4.4.4 Laboratory Pure Water

4.4.4.1 The laboratory pure water system consists of a deionization supply followed in individual labs by exchange modules and other modules capable of supplying high quality (18 megaohm) water suitable for the application.

4.4.4.2 Change system modules as recommended by the manufacturer or as indicated by water quality. Date modules when changed.

4.4.4.3 Water purity is verified by the analysis of laboratory blanks and is determined acceptable for specific analyses as prescribed in the individual method SOPs.

4.5 Laboratory Hazardous and Non-Hazardous Waste Handling and Disposal Procedures

4.5.1 Policy

It is the policy of the ASB to collect, store, package, label, ship and dispose of hazardous wastes in a manner which ensures compliance with all Federal, State and local laws, regulations and ordinances. These procedures are also designed to minimize employee exposure to hazards associated with laboratory generated hazardous wastes and to afford maximum environmental protection.

4.5.2 Policies and Procedures Manual

Policies and procedures for operation of the Division's environmental compliance program are detailed in the document, Safety Health and Environmental Management Program, Procedures and Policies Manual. This manual is available to all Staff and is monitored and maintained by the Divisional Safety, Health and Environmental Management (SHEM) Officer.

4.5.3 Regulatory Requirements

ASB is subject to the Resource Conservation and Recovery Act regulations as contained in the Georgia Rules for Hazardous Waste Management for the handling, storage and disposal of laboratory-related hazardous wastes. Generally, the laboratory is subject to the rules applicable to generators of 100-1000 kg/month.

4.5.4 Determination of Hazardous Waste

The determination of whether or not a waste (samples or waste chemicals) is a regulated substance is made by the SESD Hazardous Waste Control Officer (HWCO).

4.5.5 Waste Minimization

ASB is an active participant in pollution prevention activities. It is incumbent on each staff member to constantly be alert to ways of minimizing waste. All

appropriate solid wastes are recycled. Currently SESD has a recycle program for cardboard, aluminum cans, and mixed paper. This accounts for a large amount of the total waste stream generated by the Branch and Division.

4.5.5.1 Branch Management are responsible for ensuring that staff adhere to all Region 4 waste handling and disposal requirements for all laboratory operations. This includes the implementation of procedures (i.e., technical and/or management) designed to minimize the generation of hazardous wastes.

4.5.5.2 Waste minimization should be a prime consideration of initial experimental design and investigation planning. The degree to which waste minimization is achieved ultimately impacts the operational and cost effectiveness of our overall hazardous waste management program.

4.5.6 Tracking of Waste

A tracking system is maintained to account for monthly and annual hazardous waste generation. This system is maintained by the Divisional Waste Disposal Officer. **The Waste Disposal Officer is responsible for waste logging, acceptance for storage, and periodic shipments as required by policies and procedures.**

4.5.6.1 As part of the tracking system, the waste accumulation will be monitored to ensure that the applicable generation and accumulation (i.e., quantity/time) limits are not exceeded. Waste will be disposed of as required to ensure conformance with the regulatory limits (i.e., 180 days) and at a minimum of twice per year. Waste accumulation is tracked by the SESD Hazardous Waste Disposal Officer.

4.5.7 Waste Packaging/Labeling/Storage

All hazardous wastes designated for temporary storage must be packaged in an appropriate container designed to avoid loss or spillage of the materials. Before offering a hazardous waste for storage the Hazardous Waste Control Officer (HWCO) must be consulted. The determination of the hazardous nature of a waste is the responsibility of the HWCO. The HWCO will ensure that all containers shipped off-site are properly packaged and labeled and that the transport vehicle is appropriately placarded and manifest documentation complete.

4.5.7.1 Waste Storage - Except for in-laboratory accumulation (i.e., satellite storage (40 CFR262.34 (c)(1)), all hazardous wastes generated at the Region 4, College Station Road facility and accumulated for disposal will be stored in the Hazardous Materials (HAZMAT) Storage Facility. The HAZMAT facility is located adjacent to and detached from the main SESD building. The building is specifically designed for the storage of hazardous materials. Materials are stored in the HAZMAT facility according to compatibility groups. **Management of the HAZMAT facility is the responsibility of the SESD Hazardous Waste Control Officer.**

4.5.8 Waste Disposal

(Reference also Chapter 5 of the SHEM Policies and Procedures Manual).

4.5.8.1 Disposal of **regulated** laboratory wastes is the culmination of the waste management process and is the responsibility of the SESD Hazardous Waste Control Officer.

4.5.8.1.1 Disposal of **items used for analysis** of waste samples including glassware or equipment such as spatulas, pipettes, droppers, etc. used in contact with the concentrated waste must remain within the hood until properly cleaned or disposed in an appropriate manner. In general, disposable items may be placed in secondary containment (double bagged) and may be disposed of as ordinary waste in the dumpster. Any solvents or solutions used to clean waste from glassware or other equipment must be collected and treated the same as the waste material. Where practical and prudent for the analytical method, choose items that are disposable. **In all cases consult with the Divisional Hazardous Waste Control Officer before removing and discarding any of the contaminated materials.**

4.5.8.2 Disposal of **non-regulated/non-hazardous** solid wastes that are not recyclable may be disposed in the building dumpster. Non-regulated/ non-hazardous aqueous wastes may be flushed down the sink and then the containers should be tap water rinsed a minimum of 3 times. **However, special precautions must be taken in the disposal of acid preserved samples. Preserved samples must be neutralized.** Each person disposing of samples must maintain an awareness of the status of the laboratory centralized neutralization system. If the neutralization system is

under maintenance and/or not functional, the preserved waters must be neutralized before flushing down the sink. Spent sample containers that are not recyclable may be disposed in the dumpster and should have their labels removed or obliterated. Recyclable containers should be placed in the areas so designated.

4.5.9 Waste Records

All records related to the generation and disposal of hazardous wastes will be retained as permanent facility records. These records will be maintained in the files of the SESD Hazardous Waste Control Officer.

4.5.10 Contingency Measures

As required by 40 CFR 265.50 - 265.56, a Hazardous Waste Contingency Plan has been developed which outlines facility emergency response procedures. This plan is maintained by the SESD SHEM Officer.

4.5.11 Procedures for Satellite Hazardous Waste Accumulation

Many laboratory operations necessitate the generation of hazardous wastes (e.g., solvents, acids, etc.) which are routinely accumulated near the point of generation. The in-laboratory "satellite" accumulation of such waste should be carefully controlled by the laboratory analyst(s) working with the Hazardous Waste Control Officer so as to avoid creating an unsafe situation and also comply with RCRA temporary storage requirements. **Laboratory managers or designees shall conduct periodic walk-through inspections to ensure the proper application of temporary waste accumulation procedures.**

4.5.11.1 The RCRA regulations (40 CFR 262.34(c)(1)) permit the temporary accumulation of hazardous waste or acutely hazardous wastes at or near the point of generation. Waste accumulated in this manner are considered to be in "satellite accumulation." The following procedures apply to satellite accumulation of hazardous waste in ASB facilities:

4.5.11.1.1 All waste containers must be clearly marked with a red "Hazardous Waste" label. These labels are available from the Hazardous Waste Control Officer.

4.5.11.1.2 The contents of the container must be marked on the label. Be specific in the identification of the contents.

4.5.11.1.3 All satellite storage containers must be closed except during periods of waste transfer. Some operations (e.g., AA, LC, ICP, etc.) may require using a container lid with a hole for introducing the waste via a tube. Waste collection vessels requiring zero back pressure can be fitted with an open-to-the-air absorbent trap (e.g., carbon filled).

4.5.11.1.4 The volume of waste accumulated in the laboratory should not exceed 8 gallons. Exceptions would be instrument (i.e., AA, ICP) waste acid reservoirs and TCLP process waste.

4.5.11.1.5 Volatile and/or flammable wastes should be temporarily stored in laboratory fume hoods nearest the point of generation.

4.5.11.1.6 Caution must be exercised by the analysts to avoid creating incompatible and/or reactive waste mixtures.

4.5.11.1.7 Waste removed from "satellite" storage for disposal will be handled according to the procedures contained in the Safety, Health and Environmental Management Program, Procedures and Policies Manual.

4.5.11.1.8 All satellite accumulation containers must be placed in secondary containment.

4.5.12 Satellite Storage - Acutely Hazardous Wastes (P-Listed Wastes)

Acutely hazardous wastes are those listed in 40 CFR 261.31-261.33 and must be accounted for separately from non-acute wastes. The following procedures apply to the satellite storage of acutely hazardous wastes:

4.5.12.1 The acute hazardous waste must be collected in separate containers from the non-acute hazardous waste. The container must be labeled as containing acute hazardous waste.

4.5.12.2 Accumulation of acute hazardous waste cannot exceed one (1) quart and remain in the laboratory. Once the volume reaches one quart, the waste container must be dated and removed, in coordination with the SESD Hazardous Waste Control Officer, to the permanent hazardous waste storage area within three(3)days.

4.5.12.3 Except for the labeling and accumulation limits, acute hazardous wastes will be handled in the same manner as hazardous wastes.

4.5.13 Disposal of Outdated or Waste Chemicals/Chemical Containers

4.5.13.1 It is the individual analyst responsibility to ensure that all appropriate procedures are followed when disposing of outdated chemicals, chemicals that are no longer in use, or empty containers of spent chemicals. As a general policy, no chemicals or solvents shall be disposed by evaporation or by pouring down the sink.

4.5.13.2 The SESD Hazardous Waste Control Officer should be consulted to verify appropriate procedures.

4.5.13.3 Disposal - P-Listed Chemicals

When any unused chemical and/or the empty container(s) for a P-Listed Chemical are ready for disposal, the analyst will notify the CHO and coordinate transfer of the items to the CHO.**[Special note: If a P-Listed chemical is transferred as a single component to other containers (and remains as a single component in the new container), then each container becomes "P-Listed" for disposal purposes and must be tracked and accounted for.]** Use the following procedure for disposal of P-Listed Chemicals:

4.5.13.3.1 The CHO will document as appropriate in the Chemical Inventory system.

4.5.13.3.2 The CHO will transfer the material to the Hazardous Waste Control Officer for proper disposal. This transfer will also be noted by signature on the tracking form.

4.5.13.3.3 The Hazardous Waste Control Officer will coordinate disposal following all applicable laws, policies, and procedures.

4.5.14 Disposal - Non- P-Listed Chemicals

Follow all Standard Procedures for disposal as specified in the "Safety, Health and Environmental Management Program, Procedures and Policy Manual" and the Analytical Support Branch, "Laboratory Operations and Quality Control Manual". Any questions or concerns about disposal of unused chemicals should be referred

to the appropriate supervisor or the Hazardous Waste Control Officer for the Science and Ecosystem Support Division.